



# WholeTree For Growing Crops

**Research into a promising alternative to traditional peat-based greenhouse substrates is underway.**

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Greenhouse crops, with few exceptions, are grown in substrates composed primarily of Canadian sphagnum peat. Of major concern to growers is the rising cost of peat due mainly to the rise in transportation costs. A cost-effective, sustainable, alternative substrate is showing great promise in tests at the USDA-ARS Southern Horticultural Laboratory in Poplarville, MS.

## A Good Substrate

This substrate is made of whole pine trees (*Pinus taeda*) that are harvested from pine plantations at the thinning stage, chipped, and further ground to specifications depending on the crops to be grown. WholeTree is a product comprised of all shoot portions of the tree including wood, bark, limbs, needles, and cones if present. The substrate is mixed with necessary amendments and used fresh. In fact, we have had plants growing in substrates made from trees that just days prior were

growing in a forest plantation. You are probably telling yourself, "I thought having un-composted wood in a substrate was a bad thing?"

This is somewhat of a myth.

Many nurseries in South Alabama have been successful using pine wood shavings in their substrates for decades. Some have used upwards of 50% wood shavings in their substrates. Also, researchers and growers in Canada and many European countries have tested and are utilizing wood fiber substrates. In fact, Intertoresa AG, a company in Ittigen, Switzerland, currently has wood fiber products marketed as peat substitutes (two of which are Toresa spezial and Toresa nova). This wood fiber substrate was first introduced in 1992 at the 8th International Congress on Soilless Culture in Hunter's Rest, South Africa.

We believe our product differs from all other wood fiber products in that we are advocating using the "whole tree." The primary advantage of this

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approach is that it would allow growers to have more control over their substrates so they would no longer be dependent on an imported resource or some product that is simply a by-product of another industry (such as pine bark). In fact, large growers with a capital investment of equipment could even process their own substrate by buying trees on the open market or

better yet growing their own substrate. Companies have expressed an interest in producing WholeTree substrate and preliminary indications are that this product would cost substantially less than Canadian sphagnum peat.

**In Comparison Tests**

How does WholeTree compare to standard substrates? Well, we have con-



Glenn Fain examines plants grown in WholeTree substrate.

ducted multiple trials with many more planned and the outlook so far is very promising. Using WholeTree substrates will require special attention to nutrition with most crops requiring slightly more nitrogen — at least initially, to produce similar growth results to standard peat-based substrates.

In one study, it took as little as 800 ppm additional nitrogen over a 35-day crop cycle to produce similar results to a peat-based substrate in a crop of *Lantana camara*. The addition of a starter charge of 2-6 lbs/yd<sup>3</sup> 7-3-10 may increase growth depending on plant species.

One of the unique things about WholeTree substrates is that you can consistently produce a substrate with targeted physical properties without the need for the addition of other components such as bark or perlite, which are commonly added to commercial peat substrates. We are also developing and testing WholeTree container nursery substrates as alternatives to pine bark. Tests with these products show great potential.

With increasing fuel costs, many traditional substrate components are becoming more expensive or less available. Furthermore, local supplies of pine bark have experienced constrictions. Development of alternative substrates for production of greenhouse and nursery crops is needed. ■

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*This USDA/ARS research is a joint effort with Auburn University's Dept. of Horticulture (Dr. Charles H. Gilliam and Dr. Jeff L. Sibley) and School of Forestry and Wildlife Sciences (Dr. Thomas V. Gallagher) as well as growers in the green industry.*

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